

Fig. 1

Define “n” categories or classes of calls. Each newly arrived call is to be mapped to a class “i,” where i is any number between 1 and n.

Classification is based on

- Type of call (voice, fax, voice-band data, etc.)
- Physical distance between transmitter and receiver (local, long-distance, international, etc.)
- Type of access or egress (standard local loop, Ethernet, DSL, Cable, Wireless, etc.)
- Type of backbone (ATM, Frame Relay, IP, etc.)
- Terminal capability at each end or all ends

Figure 2

- Define a set of parameters related to Ideal_Depth of De-jitter buffer. The parameters are
- Initial value of Ideal_Depth (D0)
 - A set of rates of changes of Ideal_Depth (R1, R2, R3, etc.)
 - A set of delay threshold parameters beyond which the rate is changed (T1, T2, T3, etc.)

Define "T" as the set of all of the above parameters.

So, $I = \{D0, R1, R2, R3, T1, T2, T3, \text{etc.}\}$

Figure 3

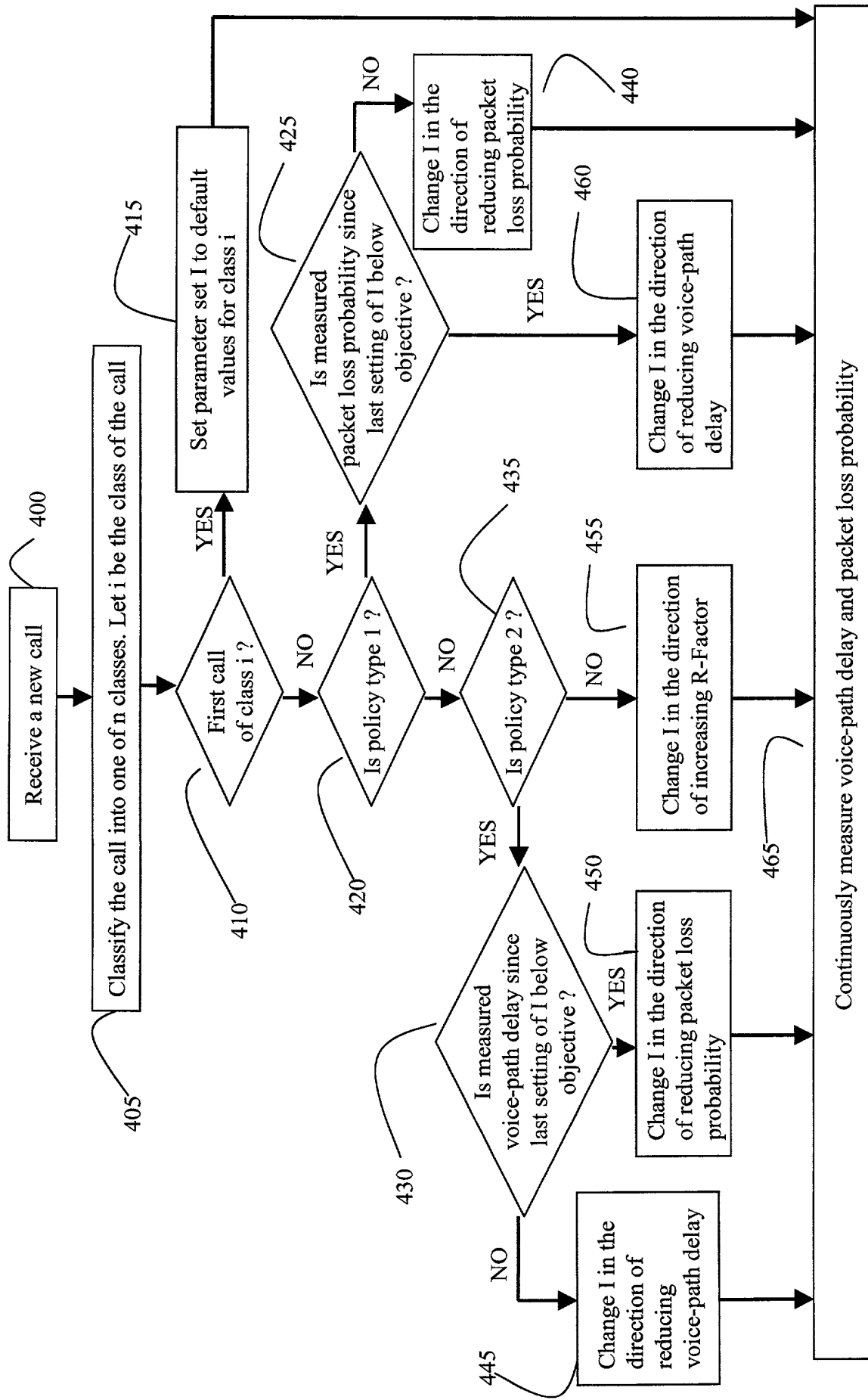


Figure 4

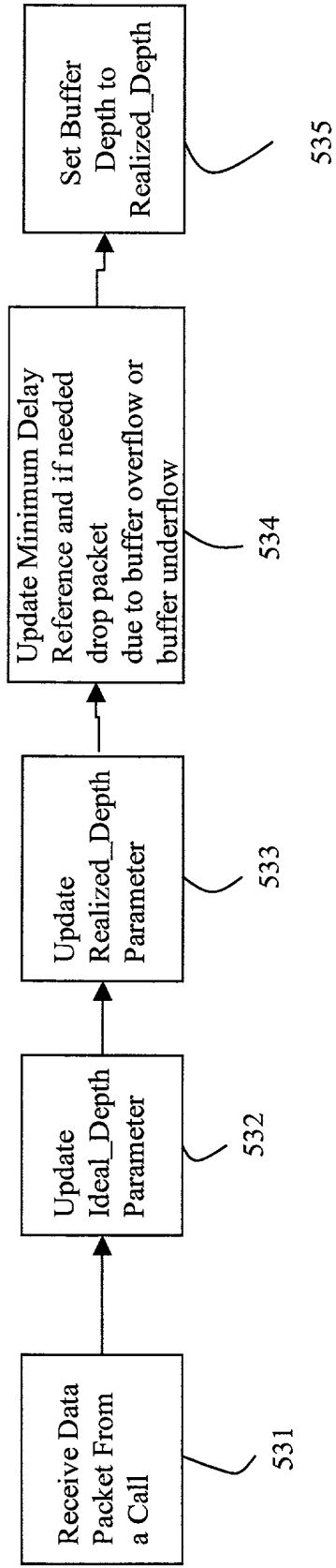


Fig. 5

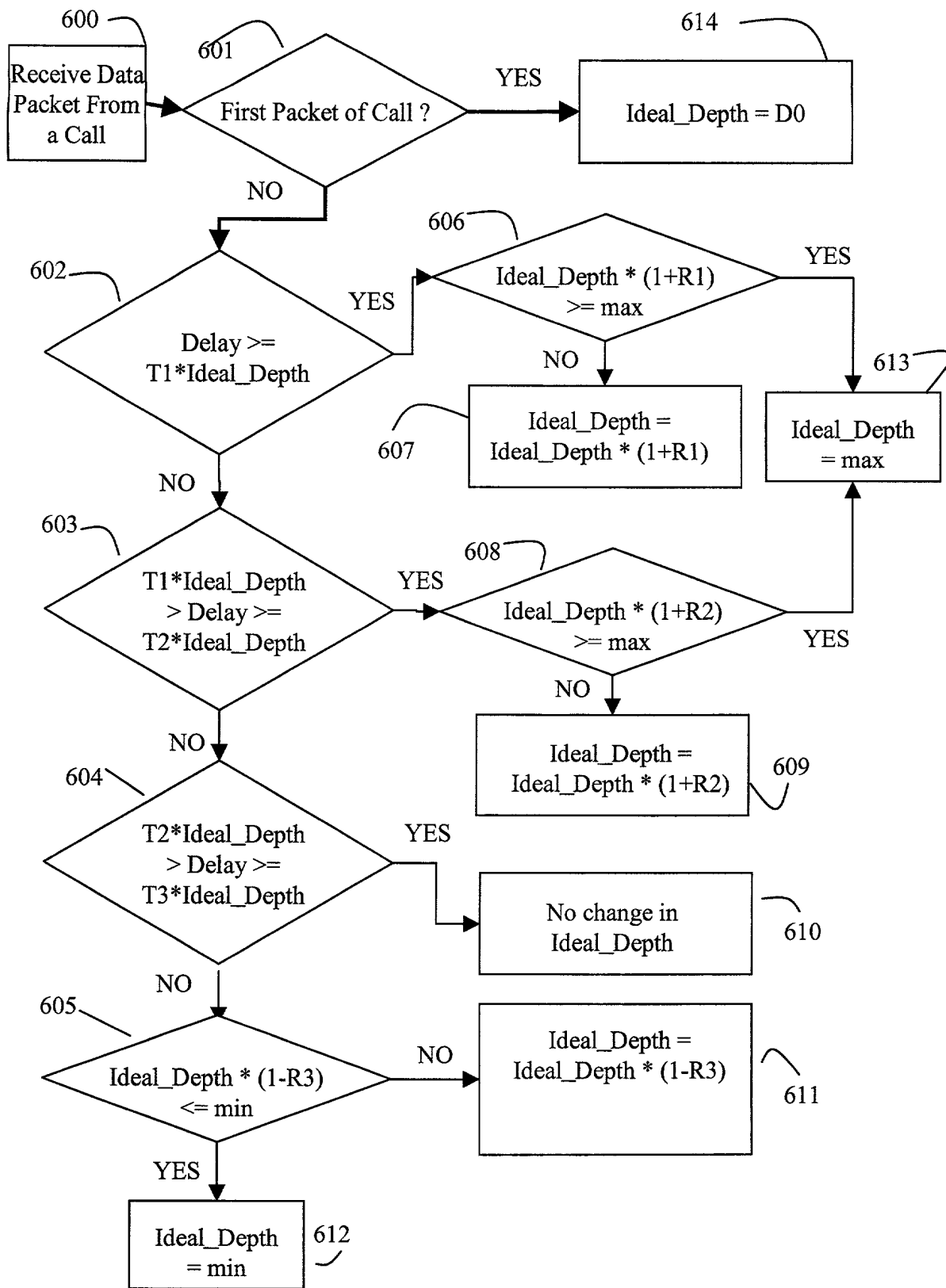


Fig. 6

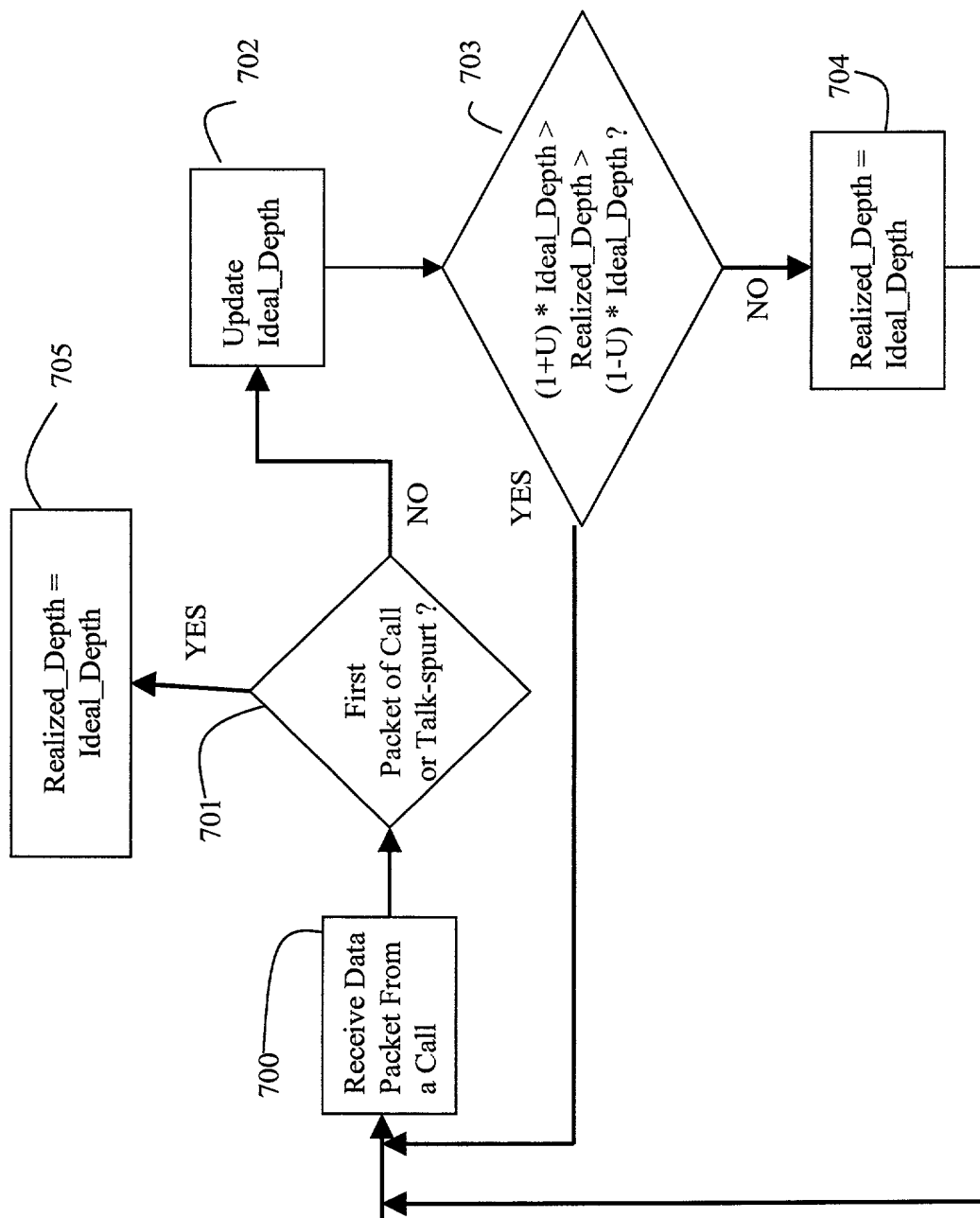


Fig. 7

Define the following parameters:

- t_0 = arrival instant of the minimum-delay packet
- L = End-to-end delay of minimum-delay packet. This delay is an absolute delay and is the difference between the instant of receiving the packet and the instant of transmitting the packet the latter being obtained from the time-stamp embedded in the packet. As an example, the RTP protocol allows such a time-stamp.
- T = packetization delay or the fixed gap between successive data packet transmissions within a call. T is a constant for all calls of a given class but may be different for different classes.
- t_a = actual arrival instant of a data packet
- $tr = t_0 + s \cdot T$ = Reference zero-delay arrival instant of a data packet where s is the sequence number of the packet minus the sequence number of the minimum-delay packet.
- Delay = $t_a - tr$. So this delay is a relative delay. It is positive if $t_a > tr$ and negative if $t_a < tr$.
- m = small fractional increase in the minimum-delay if the data packet arrives later than its reference zero-delay arrival instant.
- max = Maximum allowed value of $ideal_depth$ as well as $realized_depth$ of de-jitter buffer. Both of the depth parameters represent the amount (ideal or realized) of de-jitter buffer delay experienced by a data packet that arrives exactly at its reference zero-delay arrival instant. If a newly arriving data packet is too early to force the $realized_depth$ to exceed max then the data packet is dropped due to buffer overflow.

Figure 8

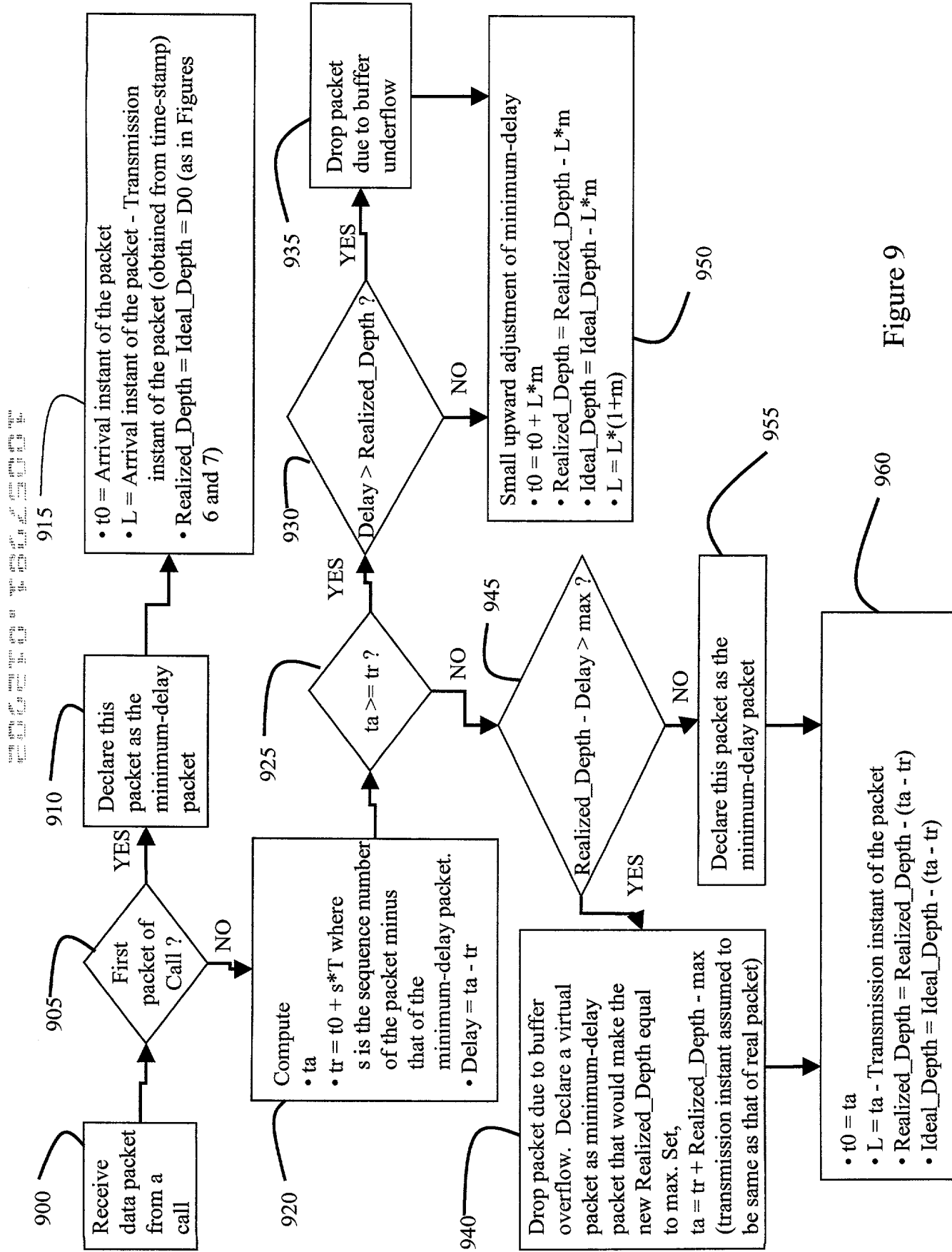


Figure 9